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Diseases and Conditions

Peripheral neuropathy

From MayoClinic.com

Special to CNN.com

Overview

Peripheral neuropathy is a term used to describe disorders of your **peripheral** nervous system. Your **peripheral** nervous system includes nerves in your face, arms, legs, torso, and some nerves in your skull. In fact, all of your nerves not located in your central nervous system — which includes the brain and the spinal cord — are **peripheral** nerves.

Neuropathies may affect just one nerve (mononeuropathy) or several nerves (polyneuropathy). Your communication between your brain and your muscles, skin, internal organs and blood vessels. When nerves can't communicate properly, and that miscommunication causes symptoms such as **pain** or **numbness**.

Peripheral neuropathy often affects people with diabetes and autoimmune diseases such as rheumatoid arthritis. Certain vitamin deficiencies, some medications and alcoholism can also damage **peripheral** nerves.

Treating the underlying condition may relieve some cases of **peripheral neuropathy**. In other cases, **peripheral neuropathy** may focus on managing **pain**. **Peripheral** nerves have a remarkable ability to regenerate themselves, and new treatments for **peripheral neuropathy** using nerve growth factors or gene therapy offer even better chances for recovery in the future.

Signs and symptoms

DIABETES AND ENDOCRINE SYSTEM

Diabetes Complications

- [Peripheral neuropathy](#)
- [Gestational diabetes](#)
- [Type 1 diabetes](#)
- [Diabetic retinopathy](#)
- [Metabolic syndrome](#)
- [Dehydration](#)
- [Type 2 diabetes](#)
- [Prediabetes](#)
- [Diabetic coma](#)
- [Diabetic hyperosmolar syndrome](#)
- [Diabetic ketoacidosis](#)

Neurological symptoms may occur related to your central nervous system, which consists of your brain and your **peripheral** nervous system, which links your spinal cord and brain to all other parts of your body. The **peripheral** network of **peripheral** nerves includes the motor nerves, which help your muscles contract, and the sensory nerves, which allow you to feel a range of sensations. In addition, your **peripheral** nerves help control some of the functions of the autonomic nervous system, which regulates your internal organs, sweat glands and blood pressure.

Unfortunately, **peripheral** nerves are fragile and easily damaged. Damage to a **peripheral** nerve can disrupt communication between the area it serves and your brain, affecting your ability to move certain muscles and feel certain sensations. Your symptoms will depend on the cause of your **neuropathy** and on which nerve or nerves are affected.

If a sensory nerve is damaged, you're likely to experience symptoms that may include:

- **Pain**
- Numbness
- Tingling
- Muscle weakness
- Burning
- Loss of feeling

These symptoms often begin gradually. You may have a tingling sensation or numbness that starts in the balls of your feet and spreads upward. Tingling might also begin in your hands and extend up your arms. In some cases your skin may become so sensitive that the slightest touch is agonizing. You may also have numbness or a complete lack of feeling, in your hands or feet.

At times your symptoms may be barely noticeable, and some people go years without realizing anything is wrong. In other cases, symptoms are constant, and especially at night may be almost unbearable. Signs and symptoms of peripheral neuropathy include:

- The sensation that you're wearing an invisible glove or sock
- Burning **pain**
- Sharp, jabbing or electric-like **pain**
- Extreme sensitivity to touch, even light touch
- Lack of coordination

If your motor nerves are affected, you may have weakness or paralysis of the muscles controlled by those nerves. If you have damage to nerves that control certain functions of the autonomic nervous system, you might experience bladder problems, reduced sweating or impotence. You might also experience a sharp fall in your blood pressure when you stand up, which may cause you to faint or feel lightheaded.

Causes

A number of factors can cause neuropathies. When a single nerve is affected, the most likely cause is a type of repetitive use that puts pressure on the nerve. Nerve pressure can result from using a cast or splint for a long time in an unnatural position — such as typing at a computer keyboard — or having abnormal bone growth.

When damage occurs to several nerves, the cause frequently is diabetes. At least half of all people with diabetes develop some type of **neuropathy**. Other common causes include alcoholism, HIV/AIDS, inherited disorders like amyloidosis and a deficiency of certain vitamins, especially B vitamins.

Other causes of **peripheral** nerve damage may include:

- **Other diseases.** These include autoimmune diseases, such as lupus and rheumatoid arthritis, liver disease and an underactive thyroid (hypothyroidism).
- **Exposure to poisons.** These may include some toxic substances and certain medications — such as chemotherapy — used to treat cancer.
- **Genetic makeup.** You may inherit a tendency to develop **peripheral neuropathy**.
- **Bacterial or viral infections.** An acute condition called Guillain-Barre syndrome frequently causes damage to all or part of your **peripheral** nerves by destroying the myelin sheath that covers them. The myelin sheath acts as an insulator for your nerves and helps conduct nerve impulses. Although the cause of Guillain-Barre syndrome isn't known, most cases occur after an infection, surgery or immune system reaction.

Unfortunately, it's not always easy to pinpoint the cause of **peripheral neuropathy**. In fact, if your **ne** associated with diabetes, it's possible the cause may never be found.

- Type 1 diabetes
- Type 2 diabetes
- Rheumatoid arthritis
- Lupus
- Guillain-Barre syndrome
- Hypothyroidism
- Amyloidosis

Risk factors

Having diabetes places you at high risk of developing **peripheral nerve damage**. In fact, at least half of people with diabetes have some form of **neuropathy**. The risk increases the longer you have diabetes, and is highest for those who've had the disease for more than 25 years. Your risk is even greater if you are older than 40 or if you are not controlling your blood sugar level.

Although researchers don't understand exactly how damage occurs, a high blood sugar level seems to damage nerves' ability to transmit signals. You can help reduce your risk by carefully following a medical plan and keeping your blood sugar level as close to normal as possible.

Your risk of developing **peripheral neuropathy** is also higher if you have one or more of the following:

- **Alcohol abuse.** Excessive drinking of alcohol can affect your nervous system, causing numb hands and feet.
 - **Vitamin deficiency.** A lack of certain vitamins, especially B-1 (thiamin) and B-12 makes **peripheral neuropathy** more likely. Pernicious anemia, which occurs when your body can't absorb B-12, leads to **peripheral neuropathy**.
 - **Immune system disorders.** You're more likely to develop **peripheral neuropathy** if you have an autoimmune disease, such as lupus or rheumatoid arthritis, or if your immune system is compromised by the human immunodeficiency virus (HIV) or AIDS.
 - **Other health problems.** Medical conditions, including certain types of cancer, kidney disease, and liver disease, also can put you at risk of nerve damage.
 - **Repetitive stress.** A job or hobby that puts stress on one nerve for long periods of time increases the risk of developing **peripheral neuropathy**. In carpal tunnel syndrome, for example, the median nerve that runs through your wrist into your fingers becomes compressed. Repetitive assembly line work or work involving prolonged, heavy gripping can compress the median nerve. Playing golf, tennis or a musical instrument, or using vibrating power tools or even crutches also can put pressure on **peripheral nerves**.
 - **Toxic substances.** Exposure to some toxic substances can make you susceptible to **peripheral nerve damage**. These substances include heavy metals, such as lead, mercury and arsenic; organic solvents; and certain medications, such as those used to treat cancer or AIDS.
-
- Alcoholism
 - Vitamin deficiency anemia
 - HIV/AIDS
 - Carpal tunnel syndrome

When to seek medical advice

See your doctor regularly if you have diabetes, a compromised immune system or any other chronic condition.

If you have a cut or sore on your foot that doesn't seem to be healing, is infected or is getting worse, see your doctor promptly, especially if you have diabetes. Even minor sores that don't heal can turn into ulcers. In the worst cases, untreated foot ulcers may become gangrenous — a condition in which the tissue dies — and may even require amputation of your foot.

Seek medical care right away if you notice any unusual tingling, weakness or pain in your hands or feet. Early diagnosis and treatment offers the best chance for controlling your symptoms and preventing further damage to your peripheral nerves. If your symptoms are interfering with your sleep or you feel depressed, your doctor or a mental health specialist may be able to suggest treatments that can help.

Screening and diagnosis

Peripheral neuropathy isn't a single disease, but rather a syndrome with many causes. For that reason, it can be difficult to diagnose. To help in the diagnosis, your doctor will likely take a full medical history and perform a physical and neurological exam that may include checking your tendon reflexes, your muscle strength and tone, and whether you feel certain sensations, and your posture and coordination.

Your doctor may also request blood tests to check your level of vitamin B-12, a urinalysis, thyroid function tests, and, often, electromyography (EMG) — a test that measures the electrical discharges produced in your muscles. As part of this test, you'll be asked to have a nerve conduction study, which measures how quickly your nerves conduct electrical signals. A nerve conduction study is often used to diagnose carpal tunnel syndrome and other peripheral nerve disorders.

Your doctor may recommend a nerve biopsy, a procedure in which a small portion of a nerve is removed for analysis. But even a nerve biopsy may not always reveal what's damaging your nerves.

- Electromyography (EMG)

Complications

Diabetic neuropathy may cause a number of complications. Damage to the nerves in your feet, along with poor circulation, can lead to ulcers and even gangrene. But it's not only your feet that are vulnerable — diabetic neuropathy can affect any organ in your body.

If nerves related to digestion are damaged, for instance, your stomach may empty too slowly, which can cause constant nausea, vomiting and bloating. Or you may have frequent constipation or diarrhea. In some cases, you may have problems with bladder control or impotence.

Other complications include:

- Partial or complete loss of movement or sensation
 - Low blood pressure
 - Impotence
 - Depression
 - Weight loss
- Constipation
 - Diarrhea
 - Depression

Treatment

The goal of treatment is to manage the underlying condition causing your **neuropathy** and repair damage to provide **symptom** relief. If your doctor hasn't been able to determine the cause of your **neuropathy**, a variety of medications to see which help ease your symptoms.

Controlling a chronic condition may not eliminate your **neuropathy**, but it can play a key role in managing what your doctor may recommend for treating various underlying conditions:

- **Diabetes.** If you have diabetes, you and your doctor can work together to keep your blood sugar as close to normal as possible. Maintaining normal blood sugar levels helps protect your nerves, though they may initially get worse before they begin to improve.
- **Vitamin deficiency.** If your **neuropathy** is the result of a vitamin deficiency, it's likely your symptoms will improve once the deficiency is corrected. Your doctor may recommend injections of vitamin B12 every 3 to 4 days, then once a month. If you have pernicious anemia, you'll need regular injections for the rest of your life and possibly additional vitamin supplements. You'll also need to eat a healthy diet.
- **Autoimmune disorder.** If your **neuropathy** is caused by an inflammatory or autoimmune process, treatment will be aimed at controlling your immune response.
- **Nerve pressure.** In cases where **neuropathy** is the result of pressure on a nerve, treatment focuses on eliminating the source of the pressure. That might mean adding ergonomic chairs, desks or changing the way you hold tools or instruments, or taking a break from computer use or sports. In some cases of nerve compression, you may need surgery to correct the problem.
- **Toxic substances or medications.** If toxins or medications are responsible for the **neuropathy**, you stop taking the medication or avoid further exposure to the toxin to prevent the **neuropathy** from progressing further.

Medications

Medications can ease **pain** symptoms, but most have side effects, especially if you take them for long periods. If you take **pain** medication regularly, including over-the-counter (OTC) products, discuss the benefits and risks with your doctor. Medications that may help provide **pain** relief for **neuropathy** include:

- **Pain relievers.** OTC **pain** relievers, such as acetaminophen (Tylenol, others), and nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin and ibuprofen (Advil, Motrin, others), usually help with **pain**. For more severe symptoms, your doctor may recommend prescription NSAIDs. If you take NSAIDs for long periods of time or in large doses, you may develop nausea, stomach **pain**, bleeding or even ulcers.
- **Anti-seizure medications.** Drugs such as gabapentin (Neurontin), carbamazepine (Tegretol) (Dilantin) were originally developed to treat seizure disorders (epilepsy). However, doctors often use them for **pain**. Side effects may include drowsiness and dizziness.
- **Lidocaine patch.** This patch contains the topical anesthetic lidocaine. You apply it to the area where the **pain** is most severe, and you can use up to three patches a day to relieve **pain**. This treatment has few side effects except, for some people, a rash at the site of the patch.
- **Tricyclic antidepressants.** Antidepressant medications, such as amitriptyline, nortriptyline (Pamelor), desipramine (Norpramin) and imipramine (Tofranil), may provide relief for mild to moderate **pain** by interfering with chemical processes in your brain that cause you to feel **pain**. Common side effects of these medications may include balance problems, dry mouth, nausea, tiredness, constipation and weight gain. To help reduce these side effects, your doctor will likely start you off at a low dose and slowly increase the dose of drug you take. If you're bothered by insomnia, your doctor may also recommend an antidepressant sleeping medication. Some studies have also suggested that selective serotonin reuptake inhibitors, such as paroxetine (Paxil) and fluoxetine hydrochloride (Prozac), may help relieve the signs and symptoms of **peripheral neuropathy**.
- **Other medications.** Opioid analgesics, such as codeine or oxycodone (OxyContin) may be used for severe **pain**. However, this class of medications produces numerous side effects, including addiction. Other drugs, such as mexiletine (Mexitil), a drug ordinarily used to treat irregular heartbeats, sometimes helps relieve burning **pain**.

Research aimed at finding more effective treatments for **peripheral neuropathy** is ongoing. For example, researchers are looking at developing nerve growth factors to reproduce the chemicals that signal your body to repair damaged nerve fibers. Unfortunately, no medications can repair nerve damage yet, but the body can regenerate nerve tissue if the substance is removed.

Therapies

Several drug-free therapies and techniques may also help with **pain** relief. Doctors frequently use these therapies with medications, but some may be effective on their own. They include:

- **Transcutaneous electrical nerve stimulation (TENS).** Your doctor may prescribe this therapy to help prevent pain signals from reaching your brain. TENS delivers tiny electrical impulses to pathways through small electrodes placed on your skin. Although safe and painless, TENS does not work for everyone or for all types of pain.
 - **Biofeedback.** This therapy uses a special machine to teach you how to control certain body responses to reduce pain. You then learn how to control these same responses yourself. Biofeedback techniques are taught in medical centers and hospitals.
 - **Acupuncture.** The National Institutes of Health has found that acupuncture can be an effective treatment for chronic pain, possibly including the pain of neuropathy. Keep in mind that you may not get it with acupuncture and may require more than one session.
 - **Hypnosis.** Many adults can be hypnotized by a trained professional, but for hypnosis to be most effective, you also have to be a willing and motivated participant. During hypnosis, you'll typically receive suggestions intended to decrease your perception of pain.
 - **Relaxation techniques.** Designed to help reduce the muscle tension that makes pain worse, these techniques range from deep-breathing exercises to visualization (imagining yourself floating in water, for example), yoga and meditation. You might want to take classes in one or more of these techniques or learn them yourself using books or tapes.
- Topical painkillers: Rubbing in relief
 - Biofeedback: Using the power of your mind to improve your health
 - Acupuncture: Sharp answers to pointed questions
 - Hypnosis: An altered state of consciousness
 - Relax: Techniques to help you achieve tranquility

Prevention

The best way to prevent **peripheral neuropathy** is to carefully manage any medical condition that puts you at risk. That means controlling your blood sugar level if you have diabetes or talking to your doctor about safe treatments if you think you may have a problem with alcohol.

Whether or not you have a medical condition, eat a healthy diet that's rich in fruits, vegetables, whole grains and protein. The best food sources of vitamin B-12 are meats, fish, eggs, low-fat dairy foods and fortified cereals. If you're a strict vegetarian, fortified cereals are a good source of vitamin B-12 for you, but you may also want to talk to your doctor about B-12 supplements.

As much as possible, avoid repetitive motions, cramped positions and toxic chemicals, all of which may damage nerves.

Self-care

The following suggestions can help you manage **peripheral neuropathy**:

- **Take care of your feet, especially if you have diabetes.** Check your feet daily for signs of blisters, calluses, tight shoes and socks can worsen pain and tingling and may lead to sores that worsen. Wear loose cotton socks and padded shoes. You can use a semicircular hoop, which is available in stores, to keep bedcovers off hot or sensitive feet.
- **Exercise.** Ask your doctor about an exercise routine that's right for you. Regular exercise may help relieve neuropathy pain and can help control blood sugar levels.
- **Quit smoking.** Cigarette smoking can affect circulation, increasing the risk of foot problems and even amputation.
- **Eat healthy meals.** If you're at high risk of neuropathy or have a chronic medical condition, diet is especially important. Emphasize low-fat meats and dairy products and include lots of fruits, vegetables and whole grains in your diet. Drink alcohol in moderation.
- **Massage your hands and feet, or have someone massage them for you.** Massage helps relieve pain and improve circulation.

circulation, stimulates nerves and may temporarily relieve pain.

- **Avoid prolonged pressure.** Don't keep your knees crossed or lean on your elbows for long periods. Doing so may cause new nerve damage.

- [Diabetes self-care: Strategies to reduce your risk of complications](#)
- [Massage: A relaxing way to relieve muscle tension](#)
- [Stop smoking: Strategies to help you quit](#)

Coping skills

Living with chronic pain or disability presents daily challenges. Some of these suggestions may make it easier to cope:


- **Set priorities.** Decide which tasks you need to do on a given day, such as paying bills or shopping for groceries, and which can wait until another time. Stay active, but don't overdo.
- **Get out of the house.** When you have severe pain, it's natural to want to be alone. But this can make it harder to focus on your pain. Instead, visit a friend, go to a movie or take a walk.
- **Seek and accept support.** It isn't a sign of weakness to ask for or accept help when you need support from family and friends, consider joining a chronic pain support group. Although support groups are for everyone, they can be good places to hear about coping techniques or treatments that have helped others. You'll also meet people who understand what you're going through. To find a support group, check with your doctor, a nurse or the county health department.
- **Prepare for challenging situations.** If something especially stressful is coming up in your life or a new job, knowing what you have to do ahead of time can help you cope.
- **Talk to a counselor or therapist.** Insomnia, depression and impotence are possible complications of peripheral neuropathy. If you experience any of these, you may find it helpful to talk to a counselor in addition to your primary care doctor. There are treatments that can help.

November 01, 2005

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